In response the FCC's Notice of Proposed Rulemaking FCC ET Docket No. 18-295 regarding Unlicensed Use of the 6 GHz Band, Ubiquiti Networks, Inc. (“Ubiquiti”), having thoroughly reviewed the Commission's outlined use in the aforementioned proposal, suggest the following rule structure in this band to which all Ubiquiti's specific clause responses will be referenced. Ubiquiti gives no input on the clauses of FCC 18-295 (18-147A1) not specifically referenced.

A major point of emphasis included in this response is the consideration of PTP use. Ubiquiti feels that exclusion of this use-case does not fully utilize the frequency band's potential which is one of the Commission’s goals with the proposed expansion. AFC integration, in the structure Ubiquiti proposes, should fully negate potential interference of existing license holders by PTP users while also allowing higher power use of the spectrum than presently constituted in FCC 18-295.

Ubiquiti also proposes a simpler coordination paradigm based solely on radial (or elliptical) proximity to the incumbent license holders. Altitude need not be taken into account. If the AFC's simply disallow frequencies within a specified radius, this should be sufficient.

Ubiquiti’s Proposed Rule Structure:

Band Designator	Frequency (MHz)	Conducted RF Power (W)	Type (AP & Client)	Antenna	Output Power (dB) EIRP (AP & Client)	Indoor/ Outdoor	Indoor Only	AFC Required
UNII 5	5925-6425	1	Fixed PTMP	No Limit	36	X		X*
			Fixed PTP	No Limit	No Limit	X		X*
		0.063	Mobile	6	24	X		*
UNII 6	6425-6525	0.25	Fixed PTMP	6	30		X	*
		0.063	Mobile	6	24	X		*
UNII 7	6525-6875	1	Fixed PTMP	No Limit	36	X		X*
			Fixed PTP	No Limit	No Limit	X		X*
		0.063	Mobile	6	24	X		*
UNII 8	6875-7125	1	Fixed PTMP	No Limit	36	X		X*
			Fixed PTP	No Limit	No Limit	X		X*
		0.063	Mobile	6	24	X		*

* Operation under 30 dBm (EIRP) does not require coordination with an AFC.

Ubiquiti’s Responses by Section (if app.):

Section	Ubiquiti Response
Section III. A. 23	"Beaconing" for client devices should be allowed in advance of acknowledging the unavailable channels for both AFC coordinated and uncoordinated devices. This is unlikely to cause interference, especially in the framework we have proposed in our response. Not including this allowance would require extensive engineering not commensurate to any benefit.
Section III. A. 1. 25	We propose that ULS be utilized by AFC installations. Any qualified AFC can monitor the ULS and disseminate to all its registered Standard-power devices. See Ubiquiti's response to Section III. A. 1. 30 for more details.
Section III. A. 1. 26	The determination should be made assuming the maximum permissible levels for simplicity's sake. An AFC will only coordinate devices operating above 30 dBm EIRP. The allowed BW's and frequencies will be determined by the AFC based on radial or elliptical proximity to an incumbent. For PTP links, with powers above 36 dBm EIRP, an additional distance from the incumbent is included. This could be done in several tiers if necessary, but Ubiquiti proposes a maximum of 3 tiers: above 36 dBm, above 46 dBm and above 56 dBm; corresponding to radii R1, R2, and R3, respectively. This assessment would take the incumbent's propagation path into account and also make some basic assumptions about the PTP radio propagation characteristics, generally (i.e type of antenna).
Section III. A. 1. 27	A decentralized model where updates are pushed to the radios seems sufficient. Registration should not be necessary, however, if a device operating above 30 dBm cannot authenticate with the AFC server for a set number of days (ex. 5 days), then the device in question would default to below 30 dBm (threshold for coordination requirement). This function would be built into the devices default behavior.
Section III. A. 1. 28	Under AFC, non-compliant bad actors are not likely to provide any identifiable information. Requiring registration of each device would add non-essential information and would not directly reduce possible interference. GPS capabilities should be required of all PTP link devices operating above 30 dBm. PTMP configurations above 30 dBm (</=36 dBm) may be allowed to authenticate/coordinate with an AFC without GPS capabilities IF they are professionally installed and the location is entered by the installer.

Section III. A. 1. 29	Any change in licensed use should trigger a re-coordination by the AFC for that location. AFC pushes the new/updated list of "unavailable frequencies" and the AP changes as needed.
Section III. A. 1. 30	Any change in incumbent/licensed use should trigger a re-coordination for that location (AFC's would pull regularly from the ULS). However, if a device has not had an update from the AFC, it should request one after no longer than 15 days. This way, no periodic checks are required by unlicensed devices unless the AFC has not sent an update for 15 days. At 15 days the AP output power is reduced to 30 dBm EIRP (the uncoordinated power limit) - required radio feature. If advanced notification to the operator is desirable, this would be built into the radio by the manufacturer, not the AFC.
Section III. A. 1. 31	The same SW security requirements for UNII 2 devices should apply to UNII 5 & 7 devices, but with respect to AFC coordination.
Section III. A. 1. 33	A single, designated AFC operator has the propensity to be monetarily restrictive for small businesses. It is the tendency for such operations to behave like the "troll under the bridge". We agree that multiple entities should be designated as AFC system operators. We urge that the FCC allow device manufacturers to participate and qualify to provide AFC. Any AFC should operate wholly independently, and be capable of all the requirements requested of an AFC. An AP should only be required to communicate with any one of several AFC's. An AFC need NOT be open to any device. A user would be required to enter the AFC web address and authenticate prior to higher powers above 30 dBm being possible on the device in question.
Section III. A. 1. 34	A similar approach to the recently implemented CBRS rules is sufficient to Ubiquiti.
Section III. A. 2. 39	We agree.
Section III. A. 2 41	These notifications should be directed to the Commission. AFC's will then pull required information from ULS.
Section III. A. 2. 51	Coordination should simply `blacklist` specific sub-bands based on the incumbent/license holder's information in ULS. Add a standard distance buffer to negate the requirement of elevation consideration/evaluation. Device height should not be limited. Additionally, some unlicensed radio links are much higher than 30 meters. Simply adding a horizontal buffer based on the device GPS location would allow ignoring height restrictions entirely [see our response to Section III. A. 2. 52]

Section III. A. 2. 52	We propose adding a standard buffer of 30 m in addition to the minimum required distance from a licensed deployment (as determined by the incumbents/FCC). In this case, elevation would be irrelevant, and only horizontal GPS location need be considered. GPS-enabled, standard-power (above 30 dBm) devices that are only capable of UNII 5, UNII 7, and UNII 8 operation, would not require professional installation. Coordination would happen automatically. GPS capabilities should be required of all PTP link devices operating above 30 dBm. PTMP standard-power devices (30-36 dBm) WITHOUT GPS would require professional installation for location entry.
Section III. A. 2. 53	Ubiquiti proposes that devices operating at or below 24 dBm (EIRP) be deemed appropriate for Mobile applications, including hotspots and peer-to-peer applications, with perhaps some restrictions for aviation use. 'Beaconing' should be allowed for any certified products. Substantial interference from beacons is extremely unlikely. Uncoordinated access across all of these proposed bands for devices under 30 dBm (EIRP) should be allowed. Using a separate frequency band and protocol (BT, ZigBee, Z-wave et al.) to coordinate the correct 'allowed' frequency with the AP before ANY transmission would be prohibitively costly to implement.
Section III. A. 2. 54	Ubiquiti proposes that any device above 30 dBm (EIRP) be required to coordinate with an AFC. Operation below 30 dBm (EIRP) need not coordinate with an AFC regardless of indoor or outdoor use. Part 15's definition of a client device is sufficient.
Section III. A. 3. 56	Given the increased distance of incumbent satellite operations relative to UNII 1 operators, Ubiquiti suggests no elevation restrictions. In any case, we propose nothing more stringent than the UNII 1 requirements for elevation restriction be put into place, but defer to the incumbents.
Section III. B. 71	GPS REGULARLY penetrates most buildings. No reasonable assumptions can be made on whether a device is indoor or outdoor based on reported GPS location. Additionally, requiring GPS on all devices in the band will be cost prohibitive. This should not be considered. Adding the warning for "Indoor use only." in the product documentation should be sufficient. Also, any device intended for indoor use only should not advertise any weather proofing features or ratings.
Section III. C. 73	Yes. Low-power use of UNII 5/7 at or below 30 dBm (EIRP) need not coordinate with an AFC regardless of indoor or outdoor use.

Section III. C. 74	This data suggests that full, efficient use of this spectrum is best accomplished if incumbent UNII-8 mobile license-holders are moved to UNII-6 or are not considered for this rulemaking. In any case, if not moved or considered for this rulemaking, they would not likely be harmed by the evolution of UNII 8 as Ubiquiti has proposed herein.
Section III. C. 76	Uncoordinated access across all of these proposed bands for devices under 30 dBm (EIRP) should be allowed. Accordingly, devices operating at or below 24 dBm (EIRP) also need not coordinate with the AFC. Ubiquiti also proposes herein that devices operating at or below 24 dBm (EIRP) be deemed appropriate for Mobile applications, including hotspots, with perhaps some restrictions for aviation use.
Section III. D. 1. 79	The distinction of rural and underserved against 'anywhere else' would be difficult to enforce. If the point of definition is not one of restriction or enforcement, defining rural or underserved is not useful. The United States Postal Service attempts to leverage this definition, unfortunately, to its and its customers detriment - this is not a recommended approach. If the goal is to efficiently use the spectrum in its entirety then adjustments to the original proposal should be considered. We recommend that high gain antennas for PTP and PTMP use in the UNII 5 and/or UNII 7 bands be allowed in accordance with Ubiquiti's proposed rules herein. To be most useful to rural and underserved markets with WISP-type applications, it is recommended that an EIRP limit be used for PTMP applications with no antenna gain limit, and that PTP applications have a conducted limit, but no EIRP limit. However if the commission determines that an EIRP limit should apply for PTP, Ubiquiti recommends no less than 60 dBm EIRP. With the AFC in place, efficient coordination between licensed use and PTP/PTMP with higher gain antennas should be seamless and would be paramount to the effective use and deployment of this spectrum.
Section III. D. 1. 81	Regarding antenna gain limits, please reference Ubiquiti's proposed rules herein. Some adjustments should be made to this original proposal. Allowing PTP and PTMP links for small WISP-type applications in the UNII 5 and UNII 7 bands would be the most effective use of the spectrum. Regarding external antennas; if an external, removable antenna is utilized AND it is intended for use with various optional antennas, we suggest the same rules already in place for Part 15 transmitters be applied here. See KDB 353028 D01. Permissible antenna TYPES with their specified maximum gain should be included in the authorization and User Manual.
Section III. D. 2. 82	We agree. We propose that -27 dBm/MHz be used for out-of-band emission limits between the sub-bands also.
Section III. D 3. 84	Devices operating under the Mobile limits that Ubiquiti has proposed (24 dBm EIRP) should be allowed use of the band in these "mobile" use-cases. But perhaps special

	considerations need to be made for aircraft use.
Section III. D. 3. 85	We agree.
Section III. E 88	Bad actors are likely to ignore this requirement in any case. If the Coordination server is effective, the need for transmitting "call signs" or other digital identifying information is not useful. We recommend not adding this requirement. If it is found to be absolutely necessary, only Outdoor AP's should be considered. Requiring this for all AP's regardless of output power "class" would unnecessarily reduce practical use of the band by adding cost-prohibitive limits to innovation.
Section III. E 89	Available frequencies, under Ubiquiti's proposed structure, are those that are entirely not in use by incumbents in that geographically defined restricted area (as determined by rules considered herein). If coordinated in advance in this manner, additional interference is not expected and additional information collection would prove burdensome. The most likely cause of possible interference in every case would be devices NOT utilizing the AFC, therefore, the extra effort to collect the additional information would be to null effect, as these potential interferers are not volunteering their information. Standard wireless access points change frequencies on a fairly regular basis. And an AP in this spectrum could seemingly move across several allowed, frequencies not specifically excluded by the AFC. It seems that coordinating actively on this granular level would be cumbersome. If the Commission determines reporting this information is necessary, Ubiquiti recommends only requiring the AP's to report it "upon-request" by the AFC (to be reported within a certain maximum time frame). This would be an automatic feature in FW.
Section III. E 90	We recommend that the fringe cases of enforcement be handled by FCC Enforcement Bureau on a case-by-case basis, when engaged by a license-holder. A special ticketing/complaint system for this may be considered, as well as a provision for designated 3rd parties, determined by the FCC, to support investigation efforts. This would ensure that the only costs accrued are directly associated with enforcement action. If AFC system operators were responsible for for enforcement, they would likely inflate the fees for coordination which could be detrimental to small businesses trying to utilize the band.

Section III. E 91	We recommend that the standard Label/E-labeling requirements for Part 15 devices apply. If notified by the FCC, user must cease use of the device, or change frequencies as instructed - so no additional labeling requirements should be needed. If a device can operate in all four bands (UNII 5 - 8) then the installer shall be instructed (in the manual or installation instructions) on setting the Indoor or Outdoor mode of operation, where Outdoor would limit operation to UNII 5 & 7 only. Manufacturer is required to restrict frequency/power accordingly per mode. Mobile devices operating at or below 24 dBm EIRP are suitable for Indoor/Outdoor use across UNII 5 - 8. Professional installation should not be required by default; only for devices with variable antennas (certified according to KDB 353028) and PTMP device without GPS capabilities operating above 30 dBm EIRP.
Appendix C Section D 19.	Uncoordinated access across these bands for devices under 30 dBm (EIRP) would facilitate more economical use for small businesses.